

**TITLE**

ASTE TEST: FUNCTIONAL TESTS

**DOCUMENT TYPE**

REPORT

**DOC No.**

AMST/ASTT/1/A

**ISSUE No.**

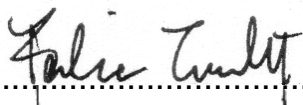
1

**DATE**

21/04/06

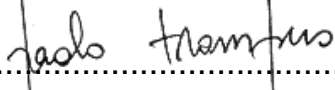
Prepared by: Fabio Turchet

(CARSO)

  
.....

Approved by: Paolo Trampus

(CARSO)

  
.....



DOC.: AMST/ASTT/1/A  
ISSUE: 1  
DATE: 21/04/06  
PAGE: 2/25  
Filename: ASTEFuncTest.doc

[illegible]



## TABLE OF CONTENTS

1.	Running a program from program memory RAM.....	5
1.1.	Hardware used.....	5
1.2.	Test.....	6
2.	Writing a program in flash boot sector and running it.....	10
2.1.	Hardware used.....	10
2.2.	Test.....	11
3.	Serial ports and internal timer.....	16
3.1.	Hardware used.....	16
3.2.	Test.....	17

## **1. Running a program from program memory RAM**

### **1.1. Hardware used**

- ASTE BOARD: mounted only DSP, FPGA U31, memories and power supply for DSP and memories, a led with a 5,6k series resistor is connected between FLAG3 output and GND.
- Laboratory power supplies for 5V
- 21020 JTAG interface
- PC with ISA JTAG ADAPTER and 21020 software development tools

## 1.2. Test

<b>TITLE:</b>	<b>RUNNING A PROGRAM FROM PROGRAM MEMORY RAM</b>				
<b>STEP</b>	<b>TEST SEQUENCE</b>	<b>EXPECTED VALUE</b>	<b>MEASURED VALUE</b>	<b>REMARKS</b>	
1	<b>Software test</b>				
1.1	Connect ASTE to power supply				
1.2	Turn on power supply				
1.3	Connect JTAG interface				
1.4	Start the emulator wice020.exe				
1.5	Assembly led.asm with the command: C:\ADI_DSP\BIN\ASM_21K.EXE led				
1.6	Link led.asm with the command: C:\ADI_DSP\BIN\LD_21K.EXE led -a led -m				
1.7	Using the emulator load the program in ASTE program memory ram				
1.8	Load in the Program Counter the value 0x800000				
1.9	Start the execution				
<b>DATE :</b>	<b>12/04/06</b>	<b>TEST CONDUCTOR:</b>	<b>FABIO TURCHET</b>	47	

## ASTE - AMS 2 FUNCTIONAL TESTS

DOC.: AMST/ASTT/1/A  
ISSUE: 1  
DATE: 21/04/06  
PAGE: 8/25  
Filename: ASTEFuncTest.doc

<b>TITLE:</b>	<b>RUNNING A PROGRAM FROM PROGRAM MEMORY RAM</b>				
<b>STEP</b>	<b>TEST SEQUENCE</b>	<b>EXPECTED VALUE</b>	<b>MEASURED VALUE</b>	<b>REMARKS</b>	
1.10	See if led is blinking	OK	OK		
1.11	After 20 hour the led is still blinking	OK	OK		
<b>DATE :</b>	<b>13/04/06</b>	<b>TEST CONDUCTOR:</b>	<b>FABIO TURCHET</b>	47	



## ASTE - AMS 2 FUNCTIONAL TESTS

DOC.: AMST/ASTT/1/A  
ISSUE: 1  
DATE: 21/04/06  
PAGE: 9/25  
Filename: ASTEFuncTest.doc

<b>TITLE:</b>	<b>RUNNING A PROGRAM FROM PROGRAM MEMORY RAM</b>				
<b>STEP</b>	<b>TEST SEQUENCE</b>	<b>EXPECTED VALUE</b>	<b>MEASURED VALUE</b>	<b>REMARKS</b>	
2	<b>Power consumption</b>				
2.1	Total +5V Measure voltage across R100-101 and calculate current	852 mA	852 mA		
2.2	Program ram and flash (+3,3V) Measure voltage across R108-111 and calculate current	363mA	363mA		
2.3	Data ram (+3,3V) Measure voltage across R113-116 and calculate current	0,4 mA	0,4 mA		
2.4	FPGA (2,5V) Measure voltage across R118-121 and calculate current	7mA	7mA		
<b>DATE :</b>	<b>13/04/06</b>	<b>TEST CONDUCTOR:</b>	<b>FABIO TURCHET</b>	<i>FT</i>	

## **2. Writing a program in flash boot sector and running it**

### **2.1. Hardware used**

- ASTE BOARD: mounted only DSP, FPGA U31, memories and power supply for DSP and memories, a led with a 5,6k series resistor is connected between FLAG3 output and GND.
- Laboratory power supplies for 5V
- 21020 JTAG interface
- PC with ISA JTAG ADAPTER and 21020 software development tools

## 2.2. Test

## ASTE - AMS 2 FUNCTIONAL TESTS

DOC.: AMST/ASTT/1/A  
ISSUE: 1  
DATE: 21/04/06  
PAGE: 12/25  
Filename: ASTEFuncTest.doc

<b>TITLE:</b>	<b>WRITING A PROGRAM IN FLASH BOOT SECTOR AND RUNNING IT</b>				
<b>STEP</b>	<b>TEST SEQUENCE</b>	<b>EXPECTED VALUE</b>	<b>MEASURED VALUE</b>	<b>REMARKS</b>	
1	<b>Software test</b>				
1.1	Connect ASTE to power supply				
1.2	Turn on power supply				
1.3	Connect JTAG interface				
1.4	Assembly ledf.asm with the command: C:\ADI_DSP\BIN\ASM_21K.EXE ledf				
1.5	Link ledf.asm with the command: C:\ADI_DSP\BIN\LD_21K.EXE ledf -a ledf -m				
1.6	Assembly flash.asm with the command: C:\ADI_DSP\BIN\ASM_21K.EXE flash				
1.7	Link flash.asm with the command: C:\ADI_DSP\BIN\LD_21K.EXE flash -a flash -m				
1.8	Start the simulator wsim020.exe				
1.9	Load the program ledf.exe in the simulator				
<b>DATE :</b>	<b>14/04/06</b>	<b>TEST CONDUCTOR:</b>	<b>FABIO TURCHET</b>		

47

<b>TITLE:</b>	<b>WRITING A PROGRAM IN FLASH BOOT SECTOR AND RUNNING IT</b>				
<b>STEP</b>	<b>TEST SEQUENCE</b>	<b>EXPECTED VALUE</b>	<b>MEASURED VALUE</b>	<b>REMARKS</b>	
1.10	Make a memory dump of program memory from 0x000000 to 0x000200 and save it as 21k.dmp				
1.11	Close the simulator				
1.12	Start the emulator wice020.exe				
1.13	Using the emulator load the program flash.exe in ASTE program memory ram				
1.14	Load the 21k.dmp in program memory starting at 0x800100				
1.15	Load in the Program Counter the value 0x800000 and start the execution				
1.16	The led turns on and the program stops (sector 0 of the flash is erased)	OK	OK		
1.17	Start again the execution				
1.18	The led turns off during programming of sector 0 and then starts blinking	OK	OK		
<b>DATE :</b>	<b>14/04/06</b>	<b>TEST CONDUCTOR:</b>	<b>FABIO TURCHET</b>	47	

## ASTE - AMS 2 FUNCTIONAL TESTS

DOC.: AMST/ASTT/1/A  
ISSUE: 1  
DATE: 21/04/06  
PAGE: 14/25  
Filename: ASTEFuncTest.doc

<b>TITLE:</b>	<b>WRITING A PROGRAM IN FLASH BOOT SECTOR AND RUNNING IT</b>				
<b>STEP</b>	<b>TEST SEQUENCE</b>	<b>EXPECTED VALUE</b>	<b>MEASURED VALUE</b>	<b>REMARKS</b>	
1.19	Close the emulator wice020.exe				
1.20	Disconnect JTAG interface				
1.21	Turn off power supply				
1.22	Turn on power supply				
1.23	See if the led is blinking	OK	OK		
<b>DATE :</b>	<b>14/04/06</b>	<b>TEST CONDUCTOR:</b>	<b>FABIO TURCHET</b>		

47

## ASTE - AMS 2 FUNCTIONAL TESTS

DOC.: AMST/ASTT/1/A  
ISSUE: 1  
DATE: 21/04/06  
PAGE: 15/25  
Filename: ASTEFuncTest.doc

<b>TITLE:</b>	<b>WRITING A PROGRAM IN FLASH BOOT SECTOR AND RUNNING IT</b>				
<b>STEP</b>	<b>TEST SEQUENCE</b>	<b>EXPECTED VALUE</b>	<b>MEASURED VALUE</b>	<b>REMARKS</b>	
2	<b>Power consumption</b>				
2.1	Total +5V Measure voltage across R100-101 and calculate current	142 mA	143 mA		
2.2	Program ram and flash (+3,3V) Measure voltage across R108-111 and calculate current	35mA	37mA		
2.3	Data ram (+3,3V) Measure voltage across R113-116 and calculate current	0,2 mA	0,22 mA		
2.4	FPGA (2,5V) Measure voltage across R118-121 and calculate current	7mA	7.5mA		
<b>DATE :</b>	<b>14/04/06</b>	<b>TEST CONDUCTOR:</b>	<b>FABIO TURCHET</b>	47	

	<p align="center"><b>ASTE - AMS 2</b> <b>FUNCTIONAL TESTS</b></p>	<p>DOC.: AMST/ASTT/1/A ISSUE: 1 DATE: 21/04/06 PAGE: 16/25 Filename: ASTEFuncTest.doc</p>
---	---	---

### **3. Serial ports and internal timer**

#### **3.1. Hardware used**

- ASTE BOARD: mounted only DSP, FPGA U31, memories and power supply for DSP and memories, a led with a 5,6k series resistor is connected between FLAG3 output and GND.
- RS232 level converter interface based on MAX233 chip
- Laboratory power supplies for 5V
- 21020 JTAG interface
- PC with ISA JTAG ADAPTER and 21020 software development tools



### 3.2. Test

## ASTE - AMS 2 FUNCTIONAL TESTS

DOC.: AMST/ASTT/1/A  
ISSUE: 1  
DATE: 21/04/06  
PAGE: 18/25  
Filename: ASTEFuncTest.doc

<b>TITLE:</b>	<b>SERIAL PORTS AND INTERNAL TIMER TEST</b>				
<b>STEP</b>	<b>TEST SEQUENCE</b>	<b>EXPECTED VALUE</b>	<b>MEASURED VALUE</b>	<b>REMARKS</b>	
1	Installing the software in ASTE board				
1.1	Connect ASTE to power supply				
1.2	Turn on power supply				
1.3	Connect JTAG interface				
1.4	Assembly serial.asm with the command: C:\ADI_DSP\BIN\ASM_21K.EXE serial				
1.5	Link serial.asm with the command: C:\ADI_DSP\BIN\LD_21K.EXE serial -a serial -m				
1.6	Assembly flash.asm with the command: C:\ADI_DSP\BIN\ASM_21K.EXE flash				
1.7	Link flash.asm with the command: C:\ADI_DSP\BIN\LD_21K.EXE flash -a flash -m				
1.8	Start the simulator wsim020.exe				
1.9	Load the program serial.exe in the simulator				
<b>DATE :</b>	<b>19/04/06</b>	<b>TEST CONDUCTOR:</b>	<b>FABIO TURCHET</b>	<i>FT</i>	

## ASTE - AMS 2 FUNCTIONAL TESTS

DOC.: AMST/ASTT/1/A  
ISSUE: 1  
DATE: 21/04/06  
PAGE: 19/25  
Filename: ASTEFuncTest.doc

<b>TITLE:</b>	<b>SERIAL PORTS AND INTERNAL TIMER TEST</b>				
<b>STEP</b>	<b>TEST SEQUENCE</b>	<b>EXPECTED VALUE</b>	<b>MEASURED VALUE</b>	<b>REMARKS</b>	
1.10	Make a memory dump of program memory from 0x000000 to 0x000200 and save it as 21k.dmp				
1.11	Close the simulator				
1.12	Start the emulator wice020.exe				
1.13	Using the emulator load the program flash.exe in ASTE program memory ram				
1.14	Load the 21k.dmp in program memory starting at 0x800100				
1.15	Load in the Program Counter the value 0x800000 and start the execution				
1.16	The led turns on and the program stops (sector 0 of the flash is erased)	OK	OK		
1.17	Start again the execution				
1.18	The led turns off during programming of sector 0 and then starts blinking	OK	OK		
<b>DATE :</b>	<b>19/04/06</b>	<b>TEST CONDUCTOR:</b>	<b>FABIO TURCHET</b>	47	

## ASTE - AMS 2 FUNCTIONAL TESTS

DOC.: AMST/ASTT/1/A  
ISSUE: 1  
DATE: 21/04/06  
PAGE: 20/25  
Filename: ASTEFuncTest.doc

<b>TITLE:</b>	<b>SERIAL PORTS AND INTERNAL TIMER TEST</b>				
<b>STEP</b>	<b>TEST SEQUENCE</b>	<b>EXPECTED VALUE</b>	<b>MEASURED VALUE</b>	<b>REMARKS</b>	
1.19	Close the emulator wice020.exe				
1.20	Disconnect JTAG interface				
1.21	Turn off power supply				
1.22	Turn on power supply				
1.23	See if the led is blinking	OK	OK		
<b>DATE :</b>	<b>19/04/06</b>	<b>TEST CONDUCTOR:</b>	<b>FABIO TURCHET</b>		

47

## ASTE - AMS 2 FUNCTIONAL TESTS

DOC.: AMST/ASTT/1/A  
ISSUE: 1  
DATE: 21/04/06  
PAGE: 21/25  
Filename: ASTEFuncTest.doc

<b>TITLE:</b>	<b>SERIAL PORTS AND INTERNAL TIMER TEST</b>				
<b>STEP</b>	<b>TEST SEQUENCE</b>	<b>EXPECTED VALUE</b>	<b>MEASURED VALUE</b>	<b>REMARKS</b>	
2	<b>Serial ports test</b>				
2.1	In order to do this test the test "1 Installing the software in ASTE board" must be already successfully completed				
2.2	Connect the RS232 level converter to serial port of the computer				
2.3	Connect the RS232 level converter to serial port 0 of ASTE BOARD				
2.4	In the computer load the program Hyperteminal (start>program>accessories>HyperTerminal and load Hypertrm.exe)				
2.5	Write the name ASTE and press OK				
2.6	Choose "connect directly to COM1" (or COM2) and press OK				
2.7	Set Bit per second: 19200 Data bits: 8 Parity: none Stopbits: 1 Protocol: none and press OK				
<b>DATE :</b>	<b>19/04/06</b>	<b>TEST CONDUCTOR:</b>	<b>FABIO TURCHET</b>		47

## ASTE - AMS 2 FUNCTIONAL TESTS

DOC.: AMST/ASTT/1/A  
ISSUE: 1  
DATE: 21/04/06  
PAGE: 22/25  
Filename: ASTEFuncTest.doc

TITLE: SERIAL PORTS AND INTERNAL TIMER TEST					
STEP	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS	
2.8	Turn on the power supply unit of ASTE board				
2.9	See if the led is blinking	OK	OK		
2.10	Type a random character (from "A" to "Z" or from "b" to "z") on the keyboard of the computer				
2.11	See if the typed character appears in hyperterminal	OK	OK		
2.12	Repeat many times step 2.9 and 2.10, the character typed must always appear in hyperterminal	OK	OK		
2.13	Connect the RS232 level converter to serial port 1 of ASTE BOARD				
2.14	Type a random character (from "A" to "Z" or from "b" to "z") on the keyboard of the computer				
2.15	See if the typed character appears in hyperterminal	OK	OK		
2.16	Repeat many times step 2.13 and 2.14, the character typed must always appear in hyperterminal	OK	OK		
DATE :	19/04/06	TEST CONDUCTOR:	FABIO TURCHET	47	

## ASTE - AMS 2 FUNCTIONAL TESTS

DOC.: AMST/ASTT/1/A  
ISSUE: 1  
DATE: 21/04/06  
PAGE: 23/25  
Filename: ASTEFuncTest.doc

<b>TITLE:</b>	<b>SERIAL PORTS AND INTERNAL TIMER TEST</b>				
<b>STEP</b>	<b>TEST SEQUENCE</b>	<b>EXPECTED VALUE</b>	<b>MEASURED VALUE</b>	<b>REMARKS</b>	
3	<b>ASTE timer test</b>				
3.1	In order to do this test the test "1 Installing the software in ASTE board" and test "2 serial ports test" must be already successfully completed				
3.2	Connect the RS232 level converter to serial port of the computer				
3.3	Connect the RS232 level converter to serial port 0 of ASTE BOARD				
3.4	In the computer load the program Hyperteminal (start>program>accessories>HyperTerminal and load ASTE.ht)				
3.5	Turn on the power supply unit of ASTE board				
3.6	See if the led is blinking	OK	OK		
3.7	Type the "a" character on the keyboard of the computer				
3.8	See if the output in hyperterminal is the timer value in the format "Txxxxxxx", where x is a hex digit	Txxxxxxx	T00002a54		
3.9	Close the timer reset switch on the ASTE board connector				
<b>DATE :</b>	<b>19/04/06</b>	<b>TEST CONDUCTOR:</b>	<b>FABIO TURCHET</b>		

47

<b>TITLE:</b>	<b>SERIAL PORTS AND INTERNAL TIMER TEST</b>				
<b>STEP</b>	<b>TEST SEQUENCE</b>	<b>EXPECTED VALUE</b>	<b>MEASURED VALUE</b>	<b>REMARKS</b>	
3.10	Type the "a" character on the keyboard of the computer				
3.11	See if the timer value is "T00000000"	T00000000			
3.12	In the computer double click on the clock in the system tray	The DATE/TIME properties window opens, showing the time in hh:mm:ss			
3.13	Open the timer reset switch on the ASTE board connector taking note of the clock time	Time:	9:27:00		
3.14	Wait about 48 hours				
3.15	Type the "a" character on the keyboard of the computer, taking note of the clock time	Time:	10:47:00		
3.16	Read the value of the ASTE timer in hyperterminal	Txxxxxxx	T0A95F15F		
3.17	Convert the value of the ASTE timer from hex to decimal (the result is in milliseconds)	ASTE timer (ms):	177598815		
3.18	Calculate the time difference between times in 3.13 and 3.15	Time difference:hh:mm:ss	49:20:00		
3.19	Convert the time difference in milliseconds	Time difference (ms):	177600000		
3.20	Calculate the time error as the difference between 3.17 and 3.19	Time error (ms):	1185		
3.21	Check if the error is less than 0,01% (Time error / Time difference)*100	<0.01%	0.000667%		
<b>DATE :</b>	<b>21/04/06</b>	<b>TEST CONDUCTOR:</b>	<b>FABIO TURCHET</b>		

47



## **ASTE - AMS 2 FUNCTIONAL TESTS**

DOC.: AMST/ASTT/1/A  
ISSUE: 1  
DATE: 21/04/06  
PAGE: 25/25  
Filename: ASTEFuncTest.doc